

What is claimed is:

1. A process for preparing emulsion polymers, in which at least one monomer composition is introduced into a reactor and polymerized in a two-phase system, which comprises passing at least one monomer composition and at least one initiator composition into a micromixer via different supply lines and mixing them therein, the initiator composition being preheated, prior to its entry into the micromixer, to a temperature at which at least one of the initiators forms free radicals, and, after the mixture formed in the micromixer has emerged, polymerizing at least a fraction of the monomers.
2. The process as claimed in claim 1, wherein the monomer composition comprises an initiator.
3. The process as claimed in claim 2, wherein the temperature of the monomer composition on entry into the micromixer is held below the decomposition temperature of the initiator present in the monomer composition.
4. The process as claimed in claim 3, wherein the temperature of the monomer composition on entry into the micromixer is in the range from 10 to 80°C.
5. The process as claimed in claim 1, wherein the temperature of the initiator composition on entry into the micromixer is in the range from 40 to 160°C.
6. The process as claimed in claim 1, wherein the temperature of the monomer composition is at least 20°C below the temperature of the initiator composition, in each case measured on entry into the micromixer.
7. The process as claimed in claim 1, wherein the monomer composition and the initiator composition comprise water.
8. The process as claimed in claim 1, wherein the monomer composition and the initiator composition comprise at least one emulsifier.

9. Process as claimed in claim 1, wherein the volume ratio of initiator composition to monomer composition is in the range from 1:1 to 1:50.
- 5 10. The process as claimed in claim 1, wherein the initiator concentration of the initiator composition is in the range from 0.01 to 5% by weight.
- 10 11. The process as claimed in claim 1, wherein the initiator composition is a solution.
- 15 12. The process as claimed in claim 1, wherein the monomer composition is an emulsion.
13. The process as claimed in claim 1, wherein at least 80% of the monomers supplied are polymerized after the mixture formed has emerged from the microreactor.
- 20 14. The process as claimed in claim 1, wherein the polymerization following emergence from the micromixer is conducted in a loop reactor.
- 25 15. Apparatus for implementing the process as claimed in claim 1, comprising at least two reservoir vessels connected via at least two feed lines to a micromixer, at least one of the feed lines being heatable, wherein said apparatus comprises a loop reactor.
16. Apparatus as claimed in claim 15, wherein pumps are provided between the reservoir vessel and the micromixer.
- 30 17. Apparatus as claimed in claim 15, wherein at least one of the feed lines has a heat exchanger.
18. Apparatus as claimed in claim 15, wherein at least one of the reservoir vessels has means for preparing an emulsion.
- 35 19. Apparatus as claimed in claim 15, wherein the micromixer comprises heating means.